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TOP SECRET

16 APR 1970

Copy No. 3

MEMORANDUM FOR: Director, Strategic Technology, ARPA

ATTENTION :

SUBJECT : Evaluation of Method Used to Estimate the Orientation  
of Soviet SS-9 Silos

1. In response to your request, a copy of NPIC's "Evaluation of the ACIC Method Used to Estimate the Orientation of Soviet SS-9 Silos" is forwarded for your retention.

2. This evaluation was undertaken at the request of the Director, Strategic Research of the Directorate for Intelligence, CIA. Analytical photogrammetrists from NPIC's Technical Services and Support Group consulted with ACIC and have critically reviewed their study. We agree with the basic theory of ACIC's primary and auxiliary methods. In addition, there was agreement with evaluation of potential error sources and with the measures taken to control the errors.

Executive Director

National Photographic Interpretation Center

Attachment:

copy 7

Distribution:

Copies 1 & 2 - D/ST/ARPA  
3 & 4 - NPIC/ODIR  
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NPIC/IEG/MSD/ (14Apr70)

GROUP 1  
Excluded from automatic  
downgrading and  
declassification

22 September 1969

MEMORANDUM FOR: Executive Director, National  
Photographic Intelligence Center

SUBJECT : Evaluation of Method Used to  
Estimate the Orientation of  
Soviet SS-9 Silos

25X1 1. The results of studies on SS-9 launch site orientations undertaken by [redacted] on behalf of the Advanced Research Projects Agency (ARPA) of the DDR&E may provide insights into Soviet strategic targeting concepts and plans. These results are based on a complex methodology involving the use of satellite photography to derive the orientation of SS-9 silo doors. Together with intelligence on site orientations and launch azimuths used at the Soviet ICBM test range, this measurement is believed to provide an indication of the preferred launch azimuth, and thus a means of limiting the number of possible targets to those which lie along the resultant theoretical flight path of the missile.

25X1 2. While promising, the method is highly dependent on the accuracy of the angular measurement of the silo door. I am informed that an error of one degree in this measurement could mean a divergence of 60 miles or more from the intended Soviet target at ICBM range. The measurements for the [redacted] study were made by the Aeronautical Chart and Information Center (ACIC) in St. Louis, Mo.

25X1 3. I would like to be in a position to judge the overall validity of the [redacted] study, but to do so I need an evaluation by the National Photographic Intelligence Center of the method used by ACIC to estimate the site orientations and an objective assessment of the significance that can be attached to the results. I am requesting, therefore, that

25X1 TOP SECRET [redacted]



## Attachment

Guidance in Evaluating the ACIC Azimuth Study

- ✓ 1. Describe briefly the method used by ACIC to measure the azimuth of the silo door.
- ✓ 2. What factors in the method most influence the results (e.g. quality of photography, rectification, repetitive coverage)?
- \* ✓ 3. How does ACIC determine the range of error in the measurement?
- ④ 4. How useful is measurement of the excavation and the security fence in deriving silo azimuths?
- ✓ 5. What adjustments, if any, are made so that the azimuth is compatible with likely targets in the US?
- ✓ 6. How has ACIC validated this method? How has ACIC demonstrated the capability of the method to yield measurements of plus or minus one degree? Evaluating the ACIC Azimuth Study, Top Secret, etc.
- ✓ 7. What is your opinion of the method, equipment and programs in the ACIC study?
- ✓ 8. What is the size of the present sample? Do you consider the sample size large enough to assure the significance of the results?

## Distribution:

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D/OSR: [REDACTED]

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CLASSIFICATION

## REQUEST FOR NPIC SUPPORT

READ INSTRUCTIONS ON REVERSE BEFORE COMPLETING FORM

|  |  |   |
|--|--|---|
| 1. REQUESTING AGENCY<br>25X1 Dir/OSR/CIA, [REDACTED] | 3. DATE PREPARED<br>25 September 1969                          | 4. DATE REQUIRED<br>1 November 1969                   |
| 5. OFFICE<br>25X1 TSSG/RED/RSB                       | 6. PHONE NO.<br>[REDACTED]                                     | 7. REQUESTER'S CONTROL NO.<br>NPIC/TSSG/RED/RSB-16/69 |
| 8. REQUESTING OFFICER<br>[REDACTED]                  | 9. SUGGESTED JOB TITLE<br>Evaluation of Azimuths of SS-9 Silos |   |
| 10. BE NO.   | 11. COUNTRY CODE   |   |

## 2. DESCRIPTION OF REQUIREMENT AND BACKGROUND INFORMATION

The attached memorandum provides background on a recent study on SS-9 launch site orientations undertaken by [REDACTED] on behalf of the Advanced Research Projects Agency (ARPA). The measurements for the [REDACTED] study were made by the Aeronautical Chart and Information Center (ACIC).

NPIC is requested to provide an evaluation of the method used by ACIC to estimate site orientations and an objective assessment of the significance that can be attached to the results. The attachment includes a list of specific questions to be considered.

*To Chris + Lou F  
29 Sep.*

## SPECIFIC REQUIREMENT

1. Evaluate math model and derivations.
2. Error analysis of measurements and of solutions.
3. Validation of ACIC error analysis.
4. Prepare a report of total evaluation to requesting Agency.

The support of Ch/APSD/TSSG will be required. It is expected that approximately 90 man-hours will be required to complete this task.

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|------------|
| [REDACTED] |
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|------------|--------------------|-------------|
| [REDACTED] | DISSEMINATION DATE | PROJECT NO. |
| [REDACTED] | [REDACTED]         | 250566      |